

THE GENERAL BOARD
United States Forces, European Theater

WAR-10
THEA
STO-CE
Ref-21

ORGANIZATION, OPERATIONS, AND EQUIPMENT OF AIR-GROUND

LIAISON IN ALL ECHELONS FROM DIVISIONS UPWARD

MISSION: Prepare report and recommendations on air-ground liaison organization, operation, and equipment.

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THE GENERAL BOARD
UNITED STATES FORCES, EUROPEAN THEATER
APO 408

ORGANIZATION, OPERATIONS, AND EQUIPMENT OF AIR-GROUND
LIAISON IN ALL ECHELONS FROM DIVISIONS UPWARD

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Appendices

1. True copy of The General Board's Directive to prepare a Report on "Organization, Operations, and Equipment of Air-Ground Liaison in all echelons from Divisions Upwards", dated 3 October 1945.
2. Chart showing 12th Army Group G-2 and G-3 Air Radio Communication Nets.
3. Chart showing First Army - IX Tactical Air Command Air Cooperation Communication System.
4. Chart showing Seventh Army Air Support Control Section Communication System.

SECTION 1

INTRODUCTION

1. The purpose of this study on organization, equipment and functions of an air-ground liaison section is to review air-ground liaison methods and procedures during operations in the European Theater, to compare those methods and procedures with recent War Department publications on the same subject and to make certain recommendations concerning these matters. Copy of directive is attached to this report as Appendix No. 1.

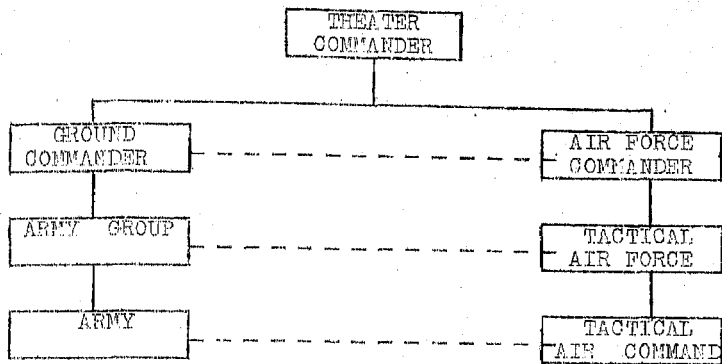
2. In scope, this subject is concerned primarily with the system of liaison for air-ground operations in the same area with combat air and ground forces, conducted by tactical air forces and army groups, or by tactical air commands and armies and their subordinate units. It does not include purely strategic air operations, airborne units and troop carrier aviation in airborne operations, air supply and evacuation, or similar operations not related to the combat effort of air and ground forces in a daily tactical role.

SECTION 2

AIR-GROUND CO-ORDINATION

3. General Requirement. Combat experience in this and other Theaters of operations has established conclusively the requirement for early and continued joint planning, close liaison, and co-ordination between appropriate headquarters of air and ground forces engaged or likely to be engaged in joint operations.¹ Many factors enter into this close relationship, such as the establishment of air and ground force headquarters adjacent one to the other with a "combined operations center", the mutual exchange of staff personnel, and air-ground communications nets separate and distinct from existing command nets.

4. Command and Control. a. Relationship of forces. As stated in War Department Field Manual 100-20, the command of air and ground forces in a theater of operations will be vested in the superior commander charged with the actual conduct of operations in the theater, who will exercise command of air forces through the air force commanders and of ground forces through the ground force commanders.² Levels of joint planning and co-ordination may be those to be found in a large theater of operations as illustrated in the following chart:



SOLID LINE - Chain of command.
BROKEN LINE - Joint planning and liaison.

The air and ground components may be smaller than those illustrated above, for the principles of air-ground liaison are applicable to all task forces containing an air and a ground element.

b. Level of joint planning. Combined air and ground effort must be integrated by joint planning at that command level which produces the maximum continuing results from the available ground and air forces. For this reason the headquarters of the ground commander and the air commander should be located so as to permit daily conferences of these commanders and their staff officers, to exchange information, discuss problems of mutual interest and formulate plans. For actual day to day operations a "combined operations center", with air and ground staff officers working together is considered most practical. Communications between non-adjacent headquarters cannot substitute for the effectiveness of personal contact between commanders and staffs at adjacent headquarters. This principle should be adhered to from the level of the Theater commander downward.

c. Control of air operations - The control of all air operations is a command function which follows the chain of command illustrated in Paragraph 4, a, preceding. The air-ground liaison system does not contemplate that ground force commanders will control or direct air activities. The system does provide a means for joint planning and for continuous and rapid exchange of current battle information between cooperating air and ground units. Air liaison officers with ground commanders advise the ground commander of air plans and capabilities. Ground liaison officers with air commanders provide current battle information and ground plans to the air commander.

SECTION 3

AIR-GROUND LIAISON SYSTEM EMPLOYED FOR OPERATIONS IN EUROPEAN THEATER OF OPERATIONS

5. Air-ground liaison in the European Theater of Operations was based on the principle of G-2 Air and G-3 Air Branches of G-2 and G-3 of the respective headquarters. Within the

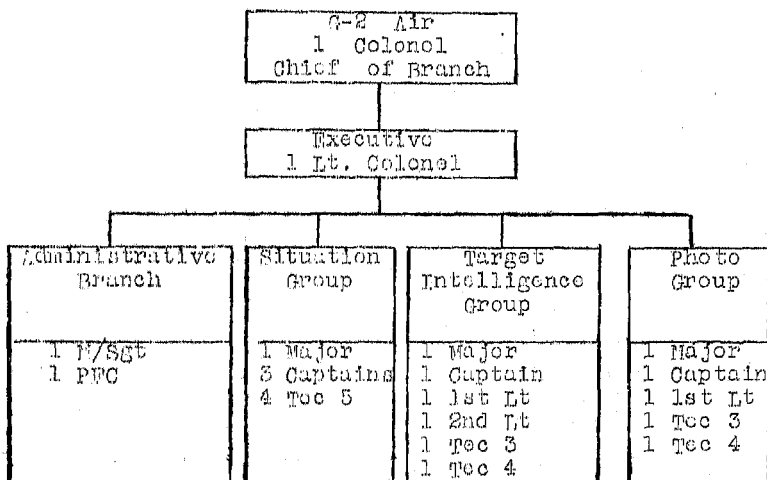
theater there were variations in the system. Under one method, a ground liaison officer and enlisted assistant was provided by the army group to the strategic air forces, and to each tactical air command headquarters, and ground liaison officer teams to the tactical air force medium bomb division headquarters and its wings and groups. Army headquarters provided ground liaison officer teams to tactical air command fighter bomber wings and groups, and to group headquarters and each squadron of the reconnaissance group. Air force officers and elements of the tactical air communications squadron from the tactical air command were used to form air parties which were located at corps and division headquarters. These air parties established liaison with corps and divisions, and with the G-3 Air officer established an integrated air-ground liaison section. The air parties provided radio and teleprinter communication from the corps, and radio communication from the division, to the tactical air command for air-ground matters. The air liaison officer acted as adviser to the corps or division commanders on air matters, co-ordinated closely with the G-3 Air on air requests and acted as forward controller with VHF (very high frequency) radio for directing fighter bomber aircraft in performance of close cooperation missions on the front of the ground forces. This system in general was that followed by 12th Army Group and Ninth Air Force headquarters and subordinate echelons.

Another method employed in the European Theater of Operations was characterized by the same mutual exchange of air liaison officers to ground units and ground liaison officers to air units. This method differed from the system described above in that the tactical air communication squadron of the tactical air command was placed under operational control of the army. Army G-3 Air formed an army air support communication net. Ground force personnel (G-3 Air) at army, corps and divisions were responsible for the operation of the net for rapid exchange of battle information and transmission of requests for air cooperation missions. This system was in use by 6th Army Group and First Tactical Air Force (Provisional) and subordinate units.

6. Analysis of 12th Army Group - Ninth Air Force System. a. General. An analysis of the system of air-ground liaison and cooperation within the 12th Army Group-Ninth Air Force tactical team is contained in brief form in Part One, Chapter V "Effect of Air Power on Military Operations, Western Europe", prepared by the Air Effects Committee, 12th Army Group. The introductory paragraph of that chapter is quoted as follows: "The overall system of air-ground cooperation developed within the Ninth Air Force-12th Army Group tactical team had a direct and highly satisfactory effect upon joint air-ground operations. It assured close co-ordination in combined operations, joint planning at all levels, and the continuous exchange of information between the services. The keynote of the system was the mutual exchange of staff personnel with the authority and training to act in an operational capacity". This Chapter V, amplified when necessary to provide pertinent detail, forms the framework upon which the following discussion is based.

Within the limits of terrain and the tactical situation the parallel echelons of the air and ground forces were located together. Since the actual tactical control of the air force or the tactical air command is centralized at these respective headquarters, the "Combined Operations Centers" were formed there. Into this center went the G-2 Air, G-3 Air personnel from the ground forces to function alongside the air personnel who controlled the tactical air operations.

b. Army Group - Air Force Headquarters. (1) Organization and Functions. (a) The G-2 Air Branch of 12th Army Group operated as a sub-section of G-2. It was divided into four general sub-divisions, each group having assigned personnel as indicated on the following chart:



G-2 Air carried out the instructions of the AC of S, G-2, 12th Army Group concerning all aerial reconnaissance and the intelligence aspects of aerial targets and advised the 12th Army Group staff on aerial photography, aerial reconnaissance, photographic interpretation and mapping policies.⁴ Within the combined operations center G-2 Air presented the enemy ground situation, submitted requests for air reconnaissance both photo and visual, and collected and disseminated information resulting therefrom. In addition to target information obtained from air sources, G-2 Air maintained complete target intelligence collected from ground force sources on suitable air objectives and with G-3 Air and the air operations personnel, engaged in the staff planning necessary for the attack thereof.⁵

(b) G-3 Air Branch. The G-3 Air Branch of 12th Army Group operated as a sub-section of G-3. Its organization was as follows:

G-3 Air
1 Colonel
Chief of Branch

1 Lt. Col.
Executive

4 Majors
(3 Duty Officers)
(1 Target Officer)

Enlisted Section
1 Tec 3 Chief Clerk
1 Tec 3 Draftsman
1 Tec 3 Opns NCO
2 Tec 5 Opns NCO

G-3 Air carried out the instructions of the Assistant Chief of Staff G-3, pertaining to air cooperation. Duties of the G-3 Air as set out in Operation Memorandum Number 1, Headquarters 12th Army Group, 29 July 1944, are quoted as follows:

"(1) Present to Ninth Air Force planned air missions requested by Army Group.

"(2) Together with A-3 Ninth Air Force, filter requests made by the tactical air commands for missions desired by 9th Bomb Division or Strategic Air Forces as a result of Army-TAC requests.

"(3) To present priorities to Ninth Air Force for allocation of medium or heavy bomber effort in army zones of action; and in certain cases to recommend allocation of the mass air effort of the entire Ninth Air Force.

"(4) To present priorities to Ninth Air Force for attack of tactical targets in intermediate and rear areas.

"(5) To be present at the daily air conference and as directed by the G-3 or Chief of Staff, present the ground force situation and the requests for air action.

"(6) To be prepared to present the Army Group picture on requests for air action at any AEAF* conferences considering such requests. *(later changed to SHAEF Air)

"(7) In association with A-3 to recommend limits of responsibility for attack of tactical targets between Army Group-Air Force and Army-TAC levels.

"(8) To insure through available communications channels the interchange of the necessary ground and air information to Army G-3 Airs and to GEO's with Ninth Bomb Division.

"(9) To work continually in close association with the A-3 Ninth Air Force and the Plans and Operations Branches of G-3, Army Group.

"(10) To keep the commanding general and staff of Ninth Air Force continually informed of the ground sit-

uation."

Although operational experience developed certain modifications of the above stated responsibilities there were no major revisions. Some of the added responsibilities included steps to co-ordinate the bomblines established by armies and subordinate units, and to arrange with army G-3 Air sections for counter-flak fires in cooperation with medium or heavy bomber attacks. For a complete statement of the operations and functions of G-3 Air in the 12th Army Group, reference is made to the "G-3 Section, 12th Army Group Report of Operations (Final After Action Report)".

(c) Ground Liaison Officer Teams. Ground liaison officers at the army group were provided from overhead allotted by the theater headquarters. These officers were under the administrative and operational control of the G-3 or G-2 Air Branches, respectively, of the army group. Enlisted personnel with the ground liaison officer teams generally consisted of one Tec 4 or Tec 5 as clerk-driver per GLO. Assignment of the personnel initially was made as follows:

One GLO (G-2 Air) each tactical air command

One GLO (G-2 Air) each TAC/R Group of tactical air commands

Three GLO's (G-3 Air) 9th Bomb Division

One GLO (G-3 Air) each bomb wing

Later, the above was expanded to include the following:

One GLO (G-3 Air) with strategic (Eighth) Air Force

One GLO (G-3 Air) with Eighth Fighter Command

One GLO (G-3 Air) each medium or light bomb group

One GLO (G-2 Air) 9th Reconnaissance Group (with Ninth Air Force)

One GLO (G-2 Air) each reconnaissance squadron 9th Reconnaissance Group

This assignment varied since the GLO Section was entirely improvised by 12th Army group headquarters. Various plans for the formation of an authorized GLO Section were proposed by the AG of S, G-3, 12th Army Group, but final action had not been accomplished at the time of the cessation of hostilities in Europe.

Ground liaison officers from G-2 Air Branch co-ordinated with the commanding officers of reconnaissance groups and with G-2 Air, army, at the tactical air commands on army group reconnaissance plans. To aid the ground liaison officers from G-2 Air, army, it sometimes was necessary for the army group GLO to interrogate pilots upon their return from reconnaissance missions. Pilots and crews were briefed for

photographic reconnaissance sorties. The resulting photographs were collated with requests and, in the absence of interpreters, first phase interpretations were carried out by army group ground liaison officers. There was constant co-ordination with Ninth Air Force on reproduction of photography and the supply and delivery of prints to G-2 Air, 12th Army Group.⁴ All observations were screened by the ground liaison officer and only that information which was of value to the army group was passed on. This information was transmitted either directly from the reconnaissance group via the G-2 Air radio net or from the tactical air command, depending on which system was considered by the ground liaison officer to have been more satisfactory.⁴

The functions of the GLO from the G-3 Air Branch 12th Army Group with air units were similar in scope to the functions of G-3 Air with Ninth Air Force. The principal duties were to:

- Maintain an operations map showing the bomblines and the disposition of friendly and enemy troops.

- Assist in briefing combat crews.

- Transmit rapidly to army group G-3 Air, and, when speed was mandatory, directly to G-3 Air at Army-Tactical Air Command combined operations, essential information concerning results of air missions or any other pertinent information.

- Inform the air unit concerning both friendly and enemy ground organization, tactics, technique and equipment.

- Keep a file of available recognition data on friendly and enemy ground force weapons and equipment.

- Provide air units with authorized information concerning the missions, objectives and plans of ground units and the progress of the ground battle.

- Maintain personal contact with G-3 Air at army group headquarters.

(d) Tactical Air Liaison Officers. In furtherance of the system of the mutual exchange of staff personnel, Ninth Air Force headquarters provided air liaison officers to each army headquarters to serve as advisors on general air matters to the army commander and staff. Ninth Air Force also furnished from 9th Bomb Division qualified officers, usually combat experienced pilots, to the various corps. The senior of these officers usually remained at the tactical air command headquarters to serve as liaison officer from the bomb division, and to co-ordinate and supervise the activities of those pilots going on to the corps. Officers with the corps served as air advisors to the commander and staff on air matters pertaining to the organization, functions, capabilities, and limitations of medium and light bomber aircraft. In addition to their primary mission, they became valuable members of the corps G-3 Air-TALO Section both in planning and operations of fighter-bomber activities.

(2) Equipment for G-2 and G-3 Air Branches of 12th Army Group was similar to that required for any other general staff section of an army group or army headquarters. No additional special or particular type equipment (except communications) was necessary for the efficient functioning of the branches. Equipment for GLO teams was not provided for in tables of equipment. It had to be gathered from various sources. A field desk, typewriter, folding table and chairs, acetate, colored crayons and the like were provided either from ground or air force sources. Transportation was provided to the extent of one one-quarter ton truck and trailer for each ground liaison officer.

(3) Communications. Army Group Headquarters. To maintain communications between the G-2/G-3 Air Branches of 12th Army Group and G-2/G-3 Airs in the combined operations centers at the army-tactical air command levels, GLOs with units of the tactical air force, and with the Eighth Air Force, four G-2/G-3 Air radio nets were provided through improvisation at the 12th Army Group-Ninth Air Force level. A net control station was maintained adjacent to the combined operations center and separate frequencies were used by each net. The tactical air commands and their respective reconnaissance groups were in three of the individual nets. In the fourth net, were the Eighth Air Force, 9th Bombardment Division and other units. For schematic diagram of these nets see Appendix No. 2. Total personnel and equipment utilized to maintain these communications were as follows:

- 8 Officers
- 65 Radio operators
- 10 Radio repairmen
- 30 Cryptographers
- 35 Crypt machine guards
- 1 Crypt repairman

149

- 12 SCR 399 (on trucks)
- 10 PR-95 Power Units
- 9 SIGABA Machines
- 12 3/4 ton WC
- 1 3/4 ton GAR
- 1 1/4 ton truck.

In addition, air force and army telephone and teleprinter lines were used extensively for the rapid exchange of information between G-2 and G-3 Air at army group headquarters and G-2/G-3 Air and ground liaison officers at subordinate air or ground units.^{3,4}

c. Army-Tactical Air Command Headquarters. (1) Organizations and Functions. Organization and functions of the air-ground liaison system in armies and tactical air commands operating under the command of 12th Army Group-Ninth Air Force followed the same general pattern as at the higher echelon. Army and tactical air command headquarters established "combined operations centers" into which G-2 and G-3 Air officers of the army went to function alongside the air staff.

The organization of the G-2 Air Branch of the army G-2

section varied in size with the respective armies. In general, however, one colonel or lieutenant colonel was the chief of branch and had three or four officer assistants and four or five enlisted assistants to perform the necessary duties. The ground liaison officer attached to the army-tactical air command level from 12th Army Group assisted the G-2 Air of the army. In addition, to take care of an excess of work caused by varying tactical situations, G-2 Air could call in a ground liaison officer from an air reconnaissance unit. Reconnaissance staff officers on duty in the tactical air command headquarters also rendered valuable assistance to the G-2 Air, a factor which emphasizes the teamwork developed between air and ground officers in the combined operations centers.

Working closely with G-2 Air was the army artillery air liaison officer who acted in a liaison capacity from the army artillery officer to the tactical air command in matters pertaining to artillery reconnaissance and adjustment by high performance aircraft of the reconnaissance group. This officer usually was installed close to the G-2 Air in the space allotted in the combined operations center.

The functions of the G-2 Air at the army-tactical air command level were essentially the same as at army group-tactical air force levels. G-2 Air attended the daily target and planning conference to present the enemy ground situation and to submit requests for air reconnaissance, both photographic and visual. His reconnaissance plan submitted each evening for the following day was in conformity with instructions from the army G-2, and the tactical situation. Based on this plan, information resulting therefrom was collected and disseminated to corps and divisions. Other duties included preparation of intelligence, weather, movement, and similar summaries gleaned throughout the day's air operations for dissemination to G-2 army, GLO's at the reconnaissance group, and G-2 Air of corps. Included also was close cooperation with G-3 Air and A-2 (G-2) target sections in planning photography and furnishing target information, and the maintenance of constant liaison with the commanding officer, army photographic interpretation detachment to ascertain the status of photographic development and reproduction. Further duties were in assisting in maintenance of the reconnaissance map, and keeping current the enemy situation on the ground situation map.

The G-3 Air Branch of army headquarters habitually was set up in the combat operations section of the tactical air command. Organization varied within the armies but in general five or six officers and four to six enlisted men comprised the strength of the branch. A composite organization, based on that within the First, Third, and Ninth Armies, shows the average personnel as follows:

Colonel or
Lt. Col. (1)

Lt. Col. or
Major (1)
Executive

Lt. Col. or Major (2)
Major or Captain (1)
Operations and/or
Duty Officers

Tech Sgt Chief Clerk (1)
Sgt or Tec 4 Opn Clk (2)
Sgt or Tec 5 Opn Clk (2)
Tec 5 or PFC Utility (1)

*Executive may serve also as planning, administrative or operations officer in addition.

The function of the G-3 Air Branch can be summed up in the following quotation: "The G-3 Air Section maintained a complete situation map and by briefings kept the air force fully informed of the ground battles. It announced priorities of subordinate units for tactical air action, and the ground force plan of action. Jointly with the air operations personnel it handled mission requests, engaged in air-ground planning, and co-ordinated the bombline. It transmitted the situation to ground liaison officers at air fields and furnished them with information necessary for briefing of combat crews. It was responsible for the interchange between ground and air units of all necessary operational data and details for co-ordination of the tactical action of those forces." ³ G-3 Air maintained constant daily contact with G-3 of the army either by dividing his time between the army and tactical air command headquarters or by frequent visits from that headquarters to the army G-3.

Ground liaison officer teams were sent from army headquarters to each wing and group of the associated tactical air command. Their assignments to the air units generally were on the basis of two officers and two enlisted men to each fighter wing headquarters, the same to each fighter bomber and reconnaissance group headquarters and to each tactical reconnaissance squadron of the reconnaissance group. One officer and one enlisted man usually were assigned to the photographic squadron headquarters of the reconnaissance group. These ground liaison officers were placed under the control of G-2 or G-3 Air of the army (according to their duties) to facilitate proper functioning and co-ordination. Their functions were essentially the same as for GLO's from army group headquarters to air units as indicated in pertinent paragraphs preceding. An additional mission for the GLO with the reconnaissance group was the compilation of results of missions for the hourly reconnaissance broadcast. Continuous liaison was maintained with the air unit, with the GLO's working and living closely with the air officers.

Tactical air liaison officers from the tactical air command were provided to corps and divisions of the army. These officers usually were combat experienced pilots. Originally these were assigned on the basis of one per corps or division, but this later was increased to two officers at the corps when experience proved it necessary. For special operations, such

as at the First Army assault of the Normandy Beaches, or the Ninth Army Rhine River crossing, the tactical air command provided additional TALOs on the basis of one per combat team of the division. Also, for breakthrough operations, one TALO was assigned to each armored combat command to ride in a forward vehicle, and, with VHF radio, maintain close liaison with fighter bomber units flying armored column cover for the armored spearhead. In each case the tactical air liaison officer acted as advisor to the ground commander on air matters, was responsible for the efficient operation of the air-ground radio or teletype net for the transmitting of requests for air cooperation missions to the Tactical Air Command headquarters, and served as forward controller with VHF radio in directing fighter bomber aircraft in close cooperation missions with the ground forces. This afforded the required flexibility in both control and communications.

(2) Equipment. Equipment for G-2 and G-3 Air Branches of the army generally was the same as for that of 12th Army Group. Transportation was furnished either from the army or air force motor pool, or by the assignment of transportation to each branch. Equipment and transportation for ground liaison officers also was the same as for the army group (See paragraph 6, b, (2)).

(3) Communications. G-3 Air. At the army-tactical air command level air-ground communications were supplied by the air forces and supplemented by ground force facilities where necessary. Tactical air liaison officers with the necessary enlisted personnel and equipment from the tactical air commands' communications squadrons formed air-ground cooperation parties to install, maintain and operate the tactical air communications nets from divisions and corps to the tactical air commands. These tactical air communication squadrons in each instance were augmented above T/O and E in order to meet the demands. This communications system was used solely for air-ground communications. Initially, and also during fluid stages of operations this system consisted solely of various radio nets with the net control station at tactical air command headquarters. After the landing in Normandy and during static phases this was supplemented by teleprinter lines from the tactical air commands to the tactical air liaison parties at corps. Air force and army telephone and teleprinter lines supplemented the air force radio and teleprinter links mentioned above. Air force radio, telephone, and teleprinter lines extended to fighter wings and groups and to the reconnaissance group headquarters as well as to air force headquarters. Communications between G-2 and G-3 Air of army and GLO's with the air units went over air force telephone and teleprinter lines. A direct telephone line was established from G-2 and G-3 army to G-2 and G-3 Air respectively. A chart of the IX Tactical Air Command-First Army Liaison Communications System, which with minor changes is identical to that of other armies in 12th Army Group is shown in Appendix No. 3.

G-2 Air. Channels of communications for tactical and photographic reconnaissance, and artillery reconnaissance missions usually were separate from communication channels to fighter or medium bomber units referred to above. Al-

though differing somewhat in the various armies, the system in use at Fifth Army-XXIX Tactical Air Command is believed indicative of the general method. Appropriate paragraphs of Memorandum Number 55-1, Headquarters XXIX Tactical Air Command, entitled SOP for Air Ground Cooperation Parties and dated 3 February 1945 are summarized below:

Tactical and photographic reconnaissance (including artillery oblique photo) missions originating from divisions will follow army communication channels from the G-2 Air at division to the G-2 Air at corps, and from the G-2 Air at corps through Army communication channels to G-2 Air at XXIX Tactical Air Command Operations; having approved the request, G-2 Air at XXIX Tactical Air Command Operations will present it through the G-2 reconnaissance officer at XXIX Tactical Air Command Operations to the Director of Reconnaissance at XXIX Tactical Air Command Operations. Replies whether acceptance or refusals, will follow the same channels back from G-2 Air and/or the Director of Reconnaissance XXIX Tactical Air Command Operations to the requesting party.

Artillery Reconnaissance Missions: (Arty/R)
Artillery reconnaissance missions originating from corps will follow army or artillery communication channels from the corps artillery commander or his representative to the artillery air officer (Arty/Air) and XXIX Tactical Air Command Operations. Replies, whether acceptance or refusals, will follow the same channels back from Arty/Air to the requesting party.

d. Corps and Divisions. (1) General. At corps and division headquarters there was no equivalent air force headquarters such as at army group and armies. Nevertheless, the principle of "combined operations" was extended forward in the close association of the G-3/G-2 Air of corps headquarters, and G-3 Air at division headquarters with the attached tactical air liaison officers. Here, air and ground personnel worked jointly in a "combined operations" section, and operated continuously during daylight hours for the close support missions on the corps and division fronts.

(2) Corps. Organization and Functions. The organization for corps headquarters provided one officer, usually a lieutenant colonel or major, as G-2 Air. This was expanded later on to include one captain as assistant G-2 Air. The functions of the G-2 Air were primarily to co-ordinate and forward all requests for air reconnaissance originating within the corps. He supervised the procurement and distribution of aerial photographs. He was responsible for the dissemination of air intelligence received, to include information obtained from interpretation of aerial photographs by the corps photo interpretation detachment. Equipment and transportation for the efficient functioning

of G-2 Air were obtained from corps headquarters.

Organization of the G-3 Air section at corps included one officer, a lieutenant colonel or major as the G-3 Air. Later changes added one captain as assistant G-3 Air. The corps G-3 Air habitually worked closely with the tactical air liaison officers attached from the air forces, in fact, the mutual interchange of ideas usually found the G-3 Air and the TALO forming one team.

The functions of G-3 Air at the corps followed the same pattern established at higher levels. The corps G-3 Air co-ordinated with the TALO on all air matters. The more important of these functions may be summarized as follows:

Co-ordination of all requests for air cooperation received from division or other subordinate units.

Preparation and processing for forwarding to the army-tactical air command combined operations center requests for pre-planned air cooperation missions to be performed for the corps and its divisions.

Responsibility for co-ordination of bombline within the corps boundaries.

Frequent visits to G-3 Air at divisions for supervision, assistance and co-ordination in planning.

Co-ordination with corps artillery in the firing of counter flak fires in support of air missions on the front of the corps.

Continuing liaison with G-3 Air at army to keep that officer posted on certain information such as the current ground situation of the corps, and results of air missions that could be determined by ground forces.³

Equipment and transportation for the G-3 Air at corps was provided from corps agencies. Equipment, including communications, for the TALO with the corps came from air force sources.

(3) Division. Organization and Functions. There was no G-2 Air designated for the division or task force. The officer in charge of the photo interpretation team at the division performed some G-2 Air functions. He and his team assisted G-2 in the planning of photographic requests, in the distribution of aerial photography, in the interpretation of the photography, in dissemination of photo intelligence, and for the familiarization of the division in the uses to be made of aerial photography.⁴

An assistant G-3 initially was designated as G-3 Air (in addition to his other duties) by divisions. Later changes in organization provided a G-3 Air within the division headquarters. The functions of the division G-3 Air were essentially the same as for the corps G-3 Air. He was responsible for co-ordination with the tactical air officer for air cooperation missions both pre-planned and immediate

originating at division or subordinate units. He established the division bombline and forwarded this information to corps G-3 Air for approval and co-ordination. Constant and continuing liaison with the division artillery was maintained for counter flak fires, and artillery marking by smoke of targets close in on the division front, for fighter-bomber close cooperation missions.

Equipment and transportation for the G-3 Air was furnished by the division, while that for the tactical air liaison officer was provided by the air force.

7. Analysis of 6th Army Group and First Tactical Air Force (Provisional) System. a. General. The system of air-ground liaison within the framework of the 6th Army Group - First Tactical Air Force (Provisional) team, with regard to the principles and uses of tactical air power in close air cooperation with the ground forces did not vary materially from that within the 12th Army Group - Ninth Air Force team. There were variations in certain methods of procedure. One of these was that the G-2 and G-3 Air Branches were not set-up within the "Combat Operations" section of the tactical air force. Another variation was in the establishment of the air-ground communication network under army rather than air force control as discussed in greater detail in later paragraphs.

b. Army Group Headquarters. (1) Organization and Functions. The G-2 Air sub-section of the Operational Intelligence Section, G-2, was concerned primarily with the intelligence aspects of target selection for aerial bombardment. Organizationally, it was small, having only two officers and two enlisted men.

G-2 Air was responsible for receiving visual air reconnaissance results and for passing that information to the commanding general, G-2, and other interested staff sections of the army group. This usually was accomplished through daily briefings. As regards photographic reconnaissance the G-2 Air was interested only in obtaining such photography as was necessary for the target work of the section and for special requests from various staff sections of the headquarters. Planning for either visual or photographic reconnaissance largely was delegated to Headquarters, Seventh Army.

The G-3 Air Branch at 6th Army Group was established as a sub-section of G-3 the same as at 12th Army Group and with approximately the same number of officers and enlisted personnel. The section usually was set up with G-3 rather than in a combined operations center with the associated tactical air force.

G-3 Air handled all air matters for the army group except for tactical and photographic reconnaissance. Planning for air cooperation in ground attacks was carried out at the daily conference of the commanding general. As in the 12th Army Group, contemplated ground plans were discussed with the Commanding General, First Tactical Air Force (Provisional) or his staff, and the overall plan worked out with close cooperation phases between air and ground units

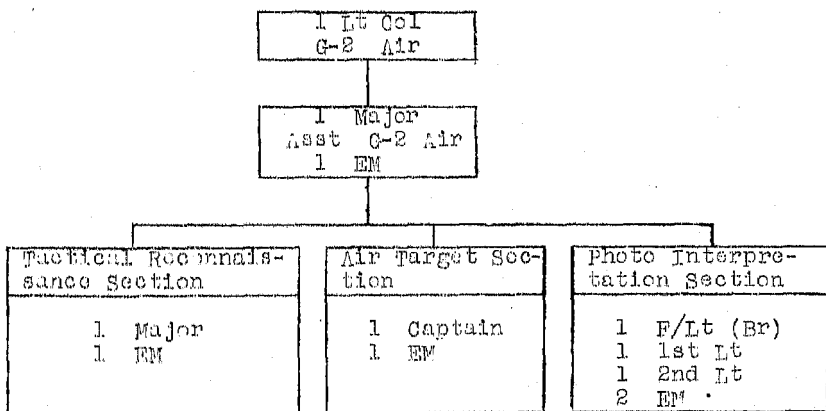
delegated to the army-tactical air command level of command.⁶ Other functions were essentially the same as those of the G-3 Air at 12th Army Group Headquarters, including supervision and control of ground liaison officers sent to the medium bomb division headquarters and subordinate units.

Ground liaison officers were furnished to the medium bomb units of First Tactical Air Force (Provisional) in much the same manner as described for the 12th Army Group-Ninth Air Force, and performed essentially the same functions.

(2) Equipment. The equipment needed for the efficient functioning of the G-2 and G-3 Air Sections was not unusual. It was provided by army group headquarters.

(3) Communications. Air-ground communications included radio and wire communications to the army air-ground liaison section, to the tactical air force, and to units of the tactical air force not in the army-tactical air command nets.

c. Army Headquarters. (1) Organization and Functions. The G-2 Air sub-section of G-2, Seventh Army Headquarters, was organized generally as follows:



With the exception of the Seventh Army Photo Center and the liaison aspects of photographic and tactical reconnaissance, all the functions of the G-2 Air were performed at army headquarters. G-2 Air acted as army co-ordinator in securing information and disseminating intelligence derived from aerial reconnaissance to army, corps and divisions. G-2 Air was responsible for briefing the army commander and his staff on aerial reconnaissance results. He prepared air plans for the approval of G-2, and co-ordinated artillery reconnaissance missions by high performance aircraft. The section processed requests for tactical and photographic reconnaissance missions except in cases where such missions were allotted to corps and direct communication between the corps tactical air liaison officer and the reconnaissance pilot was utilized. G-2 Air supervised the activities of the ground liaison officers attached to the reconnaissance group and

squadrons. He also supervised the activities of the photo center late in the campaign when that center became operational.

The G-3 Air Branch at Seventh Army Headquarters was not designated as such at first. General Order Number 14, Headquarters Seventh Army, dated 21 July 1944, originally established the Air Support Control Section as a special staff section to handle matters pertaining to air-ground cooperation. Later this was dissolved by General Order Number 87, Seventh Army, dated 9 March 1945, and concurrently re-established as the Air-Ground Liaison Section of G-3. The section was given a short title of G-3 Air. In each plan of organization, the officer personnel required was essentially the same as for comparable army headquarters. The enlisted personnel average was higher than in other armies, ranging from eight to twelve men for operations and administrative work.

The functions of the G-3 Air Branch were generally comparable to those of other armies described previously. In cooperation with G-3 and G-2, the section processed and coordinated within the army headquarters all requests for pre-arranged air attacks and all matters dealing with potential air targets. It maintained liaison with the target section of A-2 of XII Tactical Air Command for air advice on target suitability. In addition, the section had operational control of the tactical air communication squadron of the tactical air command. G-3 Air was charged with the establishment of an air-ground liaison network for the collection and dissemination of information from forward ground units, and the collection of requests from subordinate units for air support.

Ground liaison officers were furnished by Seventh Army to the XII Tactical Air Command, and its subordinate units. G-2 Air provided one GEO and clerk to the provisional reconnaissance group headquarters for liaison and another to the photographic squadron of the group. One GEO and clerk was furnished to each tactical (visual) reconnaissance squadron of the same group. G-3 Air provided GEO's, each with a clerk-driver enlisted man, to the fighter wing and each fighter group of XII Tactical Air Command. The functions of these G-2 or G-3 GEO's generally were the same as those previously described.

Tactical air liaison officers and enlisted personnel were provided by Headquarters XII Tactical Air Command to the corps and divisions of Seventh Army to serve as air advisors to the ground unit commander, and to act as forward controller for fighter bomber air strikes, to include control by the HORSEFLY method.

(2) Equipment and transportation for G-2 Air, G-3 Air and ground liaison officers of Seventh Army were generally the same as for other armies, and came from appropriate army sources. Liaison officers, usually were provided transportation to the extent of one one-quarter ton truck and trailer per officer.

(3) Communications. Air-ground communications with-

in the Seventh Army - XII Tactical Air Command team were, as stated previously, effected by placing the tactical air command's communication squadron under the operational control of the Army G-3 Air (Air-Ground Liaison Section). Air-ground communication parties with the necessary radio equipment then were formed so as to provide each G-3 Air (Air-ground Liaison officer) of corps and divisions with communications to the army G-3 Air (air-ground information center). These channels were used for the exchange of ground information and the passing of requests for pre-planned or "call" air cooperation missions. At the army center, communications were extended to the ground liaison officer teams with the wing and group headquarters of the tactical air command.

By means of an independent air control net, tactical air liaison officers (here called forward controllers) with corps and divisions maintained direct communications with the wing headquarters of XII Tactical Air Command commanding the fighter bomber groups, when immediate requests for air cooperation were necessary. The TALO at division also was in direct communication with the corps TALO. Immediate close cooperation missions from fighter group allotments made available by XII Tactical Air Command were arranged for at corps with the wing, without passing through the army net. All air force forward controllers were equipped to communicate by VHF radio with fighter bomber flight leaders and "talk them in" to the target, the same as with the TALO's of Ninth Air Force. Forward control was implemented by radar equipment, plus a specially equipped L-5 liaison aircraft for directing fighter bomber units to the target. A diagrammatic chart of this Seventh Army - XII Tactical Air Command system is shown in Appendix No. 4.

d. Corps and Divisions. G-2 and G-3 Air organization at corps and divisions within the army was generally the same as in similar units of the 12th Army Group. The corps staff had a G-3 Air and a G-2 Air. The division staff had one officer, usually a captain or major, as the G-3 Air.

The functions of the G-2 and G-3 Air at corps of the 6th Army Group were the same as described previously for other corps, except that there was the added function to G-3 Air of having operational control of the air-ground communication net. The same may be said for G-3 Air at the divisions.

Equipment. There was no special equipment needed for the G-2 or G-3 Air officers of corps and divisions, except for the air forces communications facilities "loaned" to the ground unit.

Communications for air-ground liaison within the corps and division were as described under communication for Seventh Army. Direct air-ground facilities were augmented as required by army or air force command lines.

SECTION 4

BRIEF OF WAR DEPARTMENT TRAINING CIRCULARS NUMBER 17 AND 30

8. Recognizing that variations existed in air-ground

liaison systems in the various theaters of operation, Training Circular Number 17, 20 April 1945, was issued by the War Department to provide for standardization. The War Department issued also, as a corollary to the above circular, Training Circular Number 30, 19 June 1945, which deals with the organization and employment of a tactical air command. For the purposes of later comparison in this study, pertinent provisions of both Training Circular Number 17 and Number 30 are briefed herein in paragraphs 9 and 10 respectively.

9. Training Circular Number 17 - Standard Air-Ground Liaison System. The standard Air-ground Liaison System provides that an air-ground liaison section (AGLS), be established in the headquarters of each theater, army group, army, corps, and division. The section at theater headquarters* is organized to supervise the functioning of the system throughout the theater and to provide additional ground liaison officer (GLO) team personnel for army group and army as required. It should be composed of two officers and two enlisted men selected, as far as practicable, from personnel who have had combat experience in an AGLS. Also assigned to AGLS of theater headquarters are all officers and enlisted men in GLO teams within the theater except those organically assigned army groups and army.

The air-ground liaison section in the army group will be similar to that of the army. The Air-ground Information Center (AGIC) of the section will be identical to that in the army headquarters, while the GLO sub-section will have four officers (Majors) and four technicians, 4th grade.

The air-ground liaison section of the army is the basic section of the system. It is divided into two parts, the air-ground information center and the GLO teams. The air-ground information center consists of one colonel, one lieutenant colonel, one major, one captain, and eight enlisted men. The GLO sub-section of the Army AGLS will have four majors and eight captains and six technicians 4th grade, and six technicians 5th grade.

The air-ground liaison section of the corps will consist of one lieutenant colonel, one captain, and three enlisted men. The section in the division will consist of one major and one technician 4th grade.

Each AGLS must be provided adequate motor transportation. Required transportation which is not included in tables of equipment should be provided by the theater commander.

The army air-ground liaison section will establish and operate an AGIC at army headquarters. It is advisable that the army information center be readily accessible to G-3 of the army and A-3 of the tactical air command. From this center is exercised supervision and control of the functioning of the army air-ground liaison system. The AGL section at corps and divisions and the GLO teams at air units of the tactical air command are linked to the AGIC by an air-ground information net. Net control is accomplished at the army in-

* Theater section not discussed in this study since the provisions of Training Circular No. 17 are considered adequate at this level for AGL personnel (less GLO's - See conclusions and recommendations).

formation center. The information center receives, records, and distributes current air and ground information relating to joint air-ground operations and displays this information on a situation map. The army information center prepares air requests for the approval of the army and submission to the tactical air command. Action upon these requests for air missions, the details of planned air operations, and cancellations or changes are transmitted to appropriate GLO's and AGLS's through the air-ground information net.

The army group AGLS should establish and operate an AGIC at the army group headquarters, similar to that established by the army air-ground liaison section. The army group AGIC establishes an air-ground information net for direct radio communication with GLO's of those air units of the tactical air force not in a tactical air command, with the GLO's at air units of the strategic air force when required, with the AGIC of each army and with the AGLS at theater headquarters.

GLO teams are organized as double or single teams. A double GLO team includes two officers and two enlisted men. A single GLO team includes one officer and one enlisted man. The officer members of GLO teams are specially trained in air-ground liaison. The enlisted men of the teams are trained as clerks with qualifications similar to MOS 814 or 831. Either type of team must be provided with the appropriate transportation and radio communications facilities. The transportation and radio communications personnel and facilities will be provided by the signal company, air-ground liaison, army.

A typical double GLO team is organized as follows:

- 1 major (or captain), GLO
- 1 captain, GLO
- 1 technician, 4th grade, clerk
- 1 technician, 5th grade, clerk (additional duty as driver)

Attached personnel (from signal company, AGL, army):

- 1 staff sergeant, radio operator
- 1 technician, 4th grade, radio operator
- 1 technician, 5th grade, radio operator (additional duty as driver)
- 1 technician, 5th grade, radio repairman

Equipment:

Radio, field desk, field tables and chairs, office supplies, telephone for communication with air unit to which attached; and sufficient transportation to provide mobility.

A typical single GLO team is composed of one officer and one enlisted man with the same attached personnel and equipment as shown for a double team.

Only the minimum number of GLO teams are included in the Tables of Organization of the army and army group head-

quarters. These teams form anucleus of trained GLO's who are familiar with the organization, mission, plans, and detailed procedure of their particular command. When additional GLO teams are required, they will be provided by the AGLS at theater headquarters which maintains a pool of all teams not assigned to the headquarters of armies or army groups. The army AGLS details GLO teams to elements of the tactical air command and the army group AGLS details GLO teams to elements of the tactical air force, upon request of the appropriate air commander as follows:

Air units of the tactical air command are provided GLO teams by the army AGLS on the basis of one double team to each tactical reconnaissance squadron, each photographic reconnaissance squadron and group headquarters of the reconnaissance group, each fighter group headquarters, and each tactical control center. A single GLO team is provided the fighter wing headquarters except that when the tactical control center is at the fighter wing the single GLO team may be eliminated.

Air units of the tactical air force not included in the tactical air command are provided GLO teams by the air-ground liaison section as follows:

One double team with each bombardment group, bombardment wing, and bombardment command.

Although the primary purpose of GLO teams is to provide direct liaison with air units, they may be employed temporarily at ground units. Examples of such employment are ---

To familiarize the AGLS of newly assigned divisions and corps with the standing operating procedure employed in the army's air-ground liaison system.

To link directly into the air-ground liaison system, selected ground units which do not contain an AGLS. While so employed, a GLO team functions as an AGLS.

Ground and air force command communications employed in a theater are not affected by the introduction of the standard air-ground liaison system. Likewise the communications facilities employed by the tactical air command to exercise control over aircraft in flight are not affected by the adoption of the standard Air-Ground Liaison System.

The command communications facilities referred to above, do not provide the means required for the rapid exchange of current battle information necessary for effective joint air-ground operations. Therefore the standard air-ground liaison system includes separate communications facilities for the primary purpose of providing the means for this rapid exchange between appropriate air and ground headquarters and installations. These communications facilities are used to form the air-ground infor-

mation net required by each army and army group. The operation of the army, or army group, air-ground information net is a responsibility of the army, or army group, commander.

The standard air-ground liaison system provides that each army and each army group be assigned a signal company, air-ground liaison, army, capable of operating 30 mobile radio stations, a message center, and two teletype stations. This signal company having approximately six officers and 213 enlisted men will be comparable in strength to the Army Air Forces tactical air communications squadron. When assigned to the army, this signal company supplies transportation and radio communications for GLO teams on duty with air units of the tactical air command, and for all air-ground liaison sections within the army. The signal company assigned the army group supplies transportation and radio communications to the GLO teams attached to strategic air units and tactical air force units not in the tactical air command, and radio communications for the air-ground liaison sections of the army group and theater headquarters. The signal company, air-ground liaison, army, assigned to the army or army group is placed under the operational control of the senior officer of the respective air-ground liaison sections.

The tactical air command will provide rated pilots who are qualified to act as air force liaison officers at corps or division headquarters. It is the responsibility of the army commander to request such officers from the tactical air command when the situation makes their employment desirable, and to release this personnel when operations no longer require such liaison. Since the air force liaison officer is not in a position to keep abreast of the details of current air operations, he can serve only as advisor to the ground force commander on general air force matters, such as the operation of the tactical air command and tactical air force, and the suitability of targets for attack by tactical aviation. The air force liaison officer is not a part of the army air-ground liaison system, or the air force control system. Air force liaison officers will be included in the Table of Organization of the headquarters and headquarters squadron, tactical air command.

10. Training Circular Number 30 - Tactical Air Command. The pertinent air-ground provisions of War Department Training Circular Number 30, 1945, "Tactical Air Command: Organization and Employment" are briefed herein, as follows:

The combat operations section of the tactical air command is responsible for the planning and executing of all air operations of the command. This section is mobile, and will be immediately adjacent to army or equivalent task force headquarters. The air-ground information center of this ground force headquarters is adjacent to the combat operations room or the two may occupy the same shelter. Air and ground situation maps are maintained in the combat operations room. Personnel of the combat operations section includes operations and intelligence officers. Priority three missions (close cooperation with

ground units) are co-ordinated by this section with army headquarters, as well as those second priority missions (isolation of battle area) which require co-ordination.

Combat experience has proved that a daily conference provides the most efficient method of planning air-ground operations. This conference is attended by the commanding generals of the army and tactical air command or their representatives, operations and intelligence personnel from both staffs, air-ground information center personnel and the air liaison officer at army headquarters. Based upon information available at the conference, the majority of the contemplated air missions can be planned in complete detail for the following 24 hour period of operations. The air-ground plan, re-examined at each daily conference, will determine the priority of targets and the majority of missions to be performed by the tactical air command. Pre-planning insures the co-ordinated timing of attacks and allows all units to study the details of each mission.

Corps and division air-ground liaison sections provide a radio communications net for transmitting requests for air effort. All requests are evaluated at the army air-ground information center, and approved requests are passed on to the combat operations room. Requests allowing for advance preparation are discussed at the daily conference; requests indicating prompt air action, if accepted by the tactical air command, are acted upon immediately through orders to the appropriate units. Ordinarily, objectives should be beyond artillery range and easily identifiable. Close-in cooperation missions require particular attention to the status of the bomblines.

The maximum efficiency of the tactical air command depends largely on the thorough collection and prompt dissemination of information and intelligence. It is essential to tactical air operations that personnel are kept fully informed as to the disposition of friendly and enemy forces, the nature and location of key objectives and the progress of the battle. Complete interchange of information between tactical air command and army headquarters and between tactical air forces and army group headquarters is essential to successful joint operations. Ground force responsibilities include the processing of air information vital to ground force operations from airdromes to army headquarters and subordinate army units, and the processing of ground information vital to air operations from army headquarters to airdromes.

The tactical air command provides qualified personnel to act as liaison officers at army, corps and division headquarters. These officers are usually combat experienced pilots who are trained for liaison duties in the A-3 section of the tactical air command. The air liaison officer has no control over aircraft or missions; he can serve only as advisor to the ground unit commanders on general air force matters and the suitability of targets for attack by tactical aviation.

Each tactical air command contains a tactical control group to provide the ground control of aircraft engaged in tactical air operations in the air commanders area of responsibility. This group also provides the information necessary for control, and warning information. There are three control agencies which may co-ordinate with ground units; (1) the tactical control center; (2) forward director posts; (3) forward control teams. The tactical control center is the focal point for the aircraft control and warning activities and is located as close as practicable to the combat operations room. Among the functions are included vectoring of friendly aircraft to target areas, to secondary targets and to forward director posts or forward control teams. Through dependable communications, either wire or teletype, the tactical control center keeps the forward director posts informed of all air operations in the area and briefs them on their particular missions. Close co-ordination between these agencies is maintained at all times.

The forward director posts are sub-control centers, located near the front lines beyond enemy artillery range. The decisive factors in the choice of a site are those of terrain, air-ground communications and efficiency of air operations. When these factors have been satisfied, considerable advantage will be derived at a site near a corps headquarters. The missions most frequently turned over to forward director posts are attacks on targets close to the front lines. This requires the controller to be thoroughly familiar with the ground situation in the area. By the use of radio or radar the controller is able to vector the aircraft over or close to the target.

The forward control team consists of a controller and three enlisted men normally operating under forward director posts. Equipment consists of VHF radio for air-ground communications, FM radio for point to point communications, and, if necessary, HF radio for both air-ground and point to point communication. All equipment can be carried on a vehicle and can be operated from the vehicle. These teams are highly mobile and are capable of operating while in motion. They will usually be at the front lines near division headquarters until such time as missions are assigned to them, when they will advance to a position from which they can see the target area if possible. Forward controllers may also operate from airborne aircraft.

There is no set number or allocation of forward control teams; their operations with a division, regiment, or battalion are dependent upon the need for close air cooperation on that particular front. The forward control teams primary mission is to control aircraft to a target on air-ground cooperation sorties close to the front lines.

Aircraft will be allocated to the forward controller and placed on air alert for attacking targets of opportunity, or held on ground alert awaiting his orders if no targets are immediately available. In some situations the forward controller may operate from a tank or armored car near the front of an armored column, where he aids aircraft in protecting the column and attacking targets which pre-

sent an obstacle to the advancing ground units.

11. For detailed statement of duties and responsibilities of the AGLS from the theater headquarters down to division headquarters reference is made to section V, War Department Training Circular Number 17. For training and qualification of personnel, and for procedure in air-ground operations reference is made to section VI and VII respectively of the same training circular. For details of the co-ordination of the combat operations section of the tactical air command and the AGLS of the army, reference is made to Part II, Section II of War Department Training Circular Number 30. For details of the function of the tactical control center and sub-agencies located in the area of ground units, reference is made to Part III, Sections III, IV, and V. For comparison between the standard system and the system employed in the European Theater, reference is made to section 5 of this report.

SECTION 5

COMPARISON BETWEEN EUROPEAN THEATER SYSTEMS AND STANDARD SYSTEM

12. A comparison between the systems for air-ground liaison and cooperation as employed in the European Theater of Operations and as prescribed in War Department Training Circular Number 17 supplemented by applicable provisions of War Department Training Circular Number 30 will be made in this section. These comparisons will be on such fundamental matters as organization, duties, responsibilities and communications, as shown in the paragraphs to follow.

13. Organization. a. General. The primary differences in organization are: (1) The standard air-ground liaison system provides for a separate staff section, whereas the systems in use in the European Theater were based upon sub-sections of G-2 and G-3.

(2) The standard system, in most instances, provides less personnel than was actually used and considered essential in the European Theater.

(3) The standard system provides a signal company, air-ground liaison, army, for communications, while the European Theater systems utilized the air force tactical air communications squadrons supplemented by air and ground force command channels.

b. Comparison by command echelon. (1) At army group-air force level, the standard system prescribes an air-ground information center staffed by four officers and eight enlisted men identical to that at the army-tactical air command level, plus an assignment of GLO teams of four officers and four enlisted men. In the European Theater the army group G-2 and G-3 Air personnel varied from eight officers and seven enlisted men in 6th Army Group to eighteen officers and fifteen enlisted men in 12th Army Group, plus required GLO teams. The discrepancy between army groups is due to two factors; (a) Many of the detailed

G-2 Air functions in 6th Army Group were delegated to Headquarters Seventh US Army, (b) The 12th Army Group was composed of more field armies and was associated with a larger air force. However, it is believed that the strength of the G-2 Air organization at this headquarters was exceptional.

(2) Army-Tactical Air Command. Since the army-tactical air command level is accepted under both systems as the basic operating command echelon in the air-ground liaison system, it becomes the most logical at which to base a detailed comparison. The standard system envisages at the army an "air-ground information center" manned by four officers and eight enlisted men, plus GLO teams totalling twelve officers and twelve enlisted men for duty with air units. In the European Theater, the operation of an information center was merely one of the functions of the 12th Army Group - Ninth Air Force army-tactical air command "combined operations" centers or in the air support control section of Seventh Army in 6th Army Group. A far greater function was the detailed joint planning and operations based upon the information thus gathered. Normally, an average of eight G-2 and G-3 Air officers and ten enlisted men were required for efficient operation of these ground force sections in the army-tactical air command combined operations center.

Ground liaison officer requirements under both systems are based upon the number of air force wing, group, bomb division and similar headquarters, with which it is desirable for ground commanders to maintain liaison. Though the standard system makes a definite assignment by number at army group and army level, it recognizes that the exact number required will depend upon the theater order of battle, and establishes a pool of GLO's to meet changing requirements. This is considered desirable. In the European Theater, provision for GLO's was not standardized since the existing tables of organization did not provide for a GLO section. Initial requirements prior to 6 June 1944 were met by a theater authorization for an augmentation of First Army Headquarters to provide for GLO's, with the personnel being drawn from lower units in the theater. Later assignments for GLO's in 12th Army Group and its various army headquarters were filled by transfer from the First Army, and by graduates of the GLO School at Key Field, Mississippi. The 6th Army Group and Seventh Army GLO personnel were brought from the Mediterranean and augmented by graduates of the GLO School. However, GLO sections in all headquarters had to be improvised by theater authorization rather than tables of organization assignment.

The standard system provides for double teams (two officers and two enlisted men) at all air force units except fighter wing headquarters and strategic air force headquarters as shown in paragraph 14, c, Training Circular Number 17. Experience in this theater indicates that double teams should be provided each air force unit shown in paragraph 14, c, cited above, plus a single GLO team to each tactical air command to represent G-2 Air of army group headquarters.

(3) Corps. At the corps, two officers and three enlisted men form the air-ground liaison section under the standard system. In the European Theater, whereas only two officers (one G-2 Air and one G-3 Air) were authorized for the corps, actually most corps operated with at least three ground officers, working together as one section with the tactical air liaison officers (usually three in number) to form an improvised combined operations section. An officer from corps artillery also was readily available to co-ordinate the artillery phases. From two to three enlisted men were "borrowed" from interested staff sections (G-2, G-3). Table of Organization changes 1 January 1945, alleviated this necessity in part by providing two enlisted assistants for the air-ground liaison section.

(4) In the division, the standard system provides for one officer and one enlisted man in the AGLS section. This is deemed adequate when it is considered that the TALO personnel and the officer in charge of the photo interpretation teams usually will be available to assist in air-ground liaison functions. In the European Theater, only one officer was authorized at division. It should be pointed out however, that here, as at corps, air-ground co-ordination was effected by the authorized ground and air personnel (G-3 Air, TALO and assistants) augmented by the artillery and PI officers referred to above, all functioning as one team.

14. Duties, responsibilities, and functions. a. General. Under the European Theater system the air-ground personnel were charged with all the duties and responsibilities listed under the standard system in Training Circular Number 17, and in addition, were charged with a heavy responsibility for the ground force phase of planning, co-ordinating, and execution of joint air-ground operations.

b. A detailed study of the duties and responsibilities of AGLS personnel as listed in Training Circular Number 17 fails to reveal where at any level responsibility for the planning or execution of joint air-ground operations are charged to ground force personnel. In effect, the "Combined Operations" principle is not stressed. Some of the routine and accepted duties under the European Theater system that are omitted by the training circular are; planning upon which to base air requests; the supervision to insure continuous co-ordination during execution of joint plans; plus such co-ordinating factors as counter-flak fires and target-marking.

The standard system prescribed in Training Circular Number 17 does not go into a detailed discussion of the duties of the air liaison officer. It does state however that this officer is not a part of the army air-ground liaison system or the air force control system. Under the system employed in the European Theater the TALO was equipped to, and did, exercise control of aircraft in flight and acted generally in the capacity of a forward operations officer on close cooperation missions performed for corps and divisions. An advantage of this was that the TALO, being

closely associated with the ground staff, was conversant with the detailed ground tactical situation.

Training Circular Number 30 provides for two lower echelons of the tactical air command control center, i.e., the forward director post and the forward control team, to be located in the battlefield area to perform the necessary close control functions in addition to their normal control functions. However, War Department Training Circular Number 30 is not specific as to the relationship between these lower control echelons and the AGCS at the corresponding lower command echelons. It merely states that terrain and air-ground communication facilities will determine the location of the forward director post and that it may be near a corps headquarters. It states further that the forward control teams will be located "near division headquarters until such time as a mission is assigned to them, when they will advance to a position from which they can see the target area if possible --- (they) may also operate from airborne aircraft."

15. Equipment. a. Under both systems, the equipment involved is virtually the same.

b. Under the European Theater system, necessary equipment for the G-2 Air and G-3 Air Branches of the respective general staff sections was provided through normal supply channels; the type of equipment was the same at all echelons, and varied in amount only in direct proportion to the number of personnel involved.

Each GIO was eventually equipped with the necessary means to function properly to include one one-quarter ton truck and trailer made available from theater or army group headquarters.

Though the standard system is vague on the matter of equipment, it is assumed that as a result of its setting up the AGC section as a separate staff section an appropriate T/E will be provided, based generally upon combat requirements.

16. Command and Control. a. General. Under both systems, command and control are basically as outlined in Field Manual 100-20.

b. The levels of joint planning as outlined in Training Circular Number 17, and the accepted doctrine on command and control of air power, stated in Field Manual 100-20 and repeated in Training Circulars Number 17, and Number 30, were followed with success in the European Theater. To accomplish this, 12th Army Group and Ninth Air Force, and their subordinate army and tactical air commands established combined operations centers. As stated previously 6th Army Group and Seventh Army did not place their G-2 and G-3 Air personnel in the combined operations centers but carried out the principle by close liaison of the respective operations sections.

17. Communications. a. General. The communications

means outlined in Training Circular Number 17 are essentially the same as that authorized in the European Theater, but differs in organizational assignment. However, in actual practice in the European Theater it was found necessary by the air forces to augment greatly by improvisation the authorized tactical air communications squadrons, in both personnel and equipment since the T/O unit provided could not have met the operational demands placed upon it. This was true despite the fact that G-2 Air used army command communication channels for its work.

b. The standard system prescribes that a signal company, similar in strength and organization to the tactical air communication squadron, be assigned to the AGL section of the army group and army to function under its direction. Thus provision is made for an integral air-ground liaison net to include G-2 Air matters, maintained and operated by the ground forces - but not linked physically into the air force control net. In the European Theater, with the tactical air forces furnishing the radio, and in some instances, teleprinter communications, both air and ground personnel made use of the tactical air communications net, supplemented by ground and air force telephone and teleprinter command nets. One communication need, not covered either in the discussion of the air-ground liaison system employed in the European Theater, or in Training Circular Number 17 is for an adequate air-ground cipher code purely for air-ground matters. This need was felt keenly during operations in the European Theater. Such a code would have improved security, and undoubtedly would have speeded up radio messages regarding air-ground cooperation.

18. Training and Qualification. a. General. Comparison of training under the two systems is difficult, since the European Theater system was operated chiefly by officers who were trained on the job. As to qualification, it was found that the more important requirements for either air or ground officers was an ability to maintain harmonious relation with air and ground personnel and that they be particularly well qualified in the organization, tactics and technique of their respective branches. In all joint planning and operations each necessarily functioned as the specialist in his own service. The training prescribed in Training Circular Number 17, particularly in the case of ground officers, heavily emphasizes training in the air forces.

b. Ground Force Personnel. There was a wide variation in the training and back ground of G-2 Air, G-3 Air and GLO personnel in the European Theater. Many of these officers had commanded small units and had staff experience at several echelons, and were graduates of several service schools. The G-2 and G-3 Air officers above division level were very often graduates of the Command and General Staff School. It was found to be essential that the G-3 Air officers be well grounded in the tactics and techniques of the combat components of the air and ground forces and know the capabilities of existing communication means. The G-2 Air officers had

to be well grounded in the composition and capabilities of photo interpretation detachments, organization, technique and capabilities of reconnaissance aviation units, and the needs and uses of aerial photographs by staff sections and combat echelons. They also had to know the capabilities of G-2 ground force agencies for securing information in order to collate air and ground reports for target purposes. It was essential that the GLO's know the organization and capabilities of combat echelons of the ground forces and the functions of the operational staffs of these units, as well as the weapons utilized. They were G-2 or G-3 representatives of the ground forces.

The standard system specifies that specialized training should be given ground liaison officer personnel but stresses the type training previously given at the GLO School at Key Field. That training emphasized the study of the air forces (Paragraph 26, Training Circular Number 17). It is obvious that unless these officers had other schooling on ground force and staff cooperation subjects that they would not be properly equipped to function as liaison officers for ground force commanders.

c. Air Force Personnel. There was a wide variation in the background and training of TALO's in this theater. Some previously had been ground force officers, while others always had been air force personnel. Some were combat pilots, others observers, and others air force staff officers. Those who were combat pilots and had previous operational air staff experience were best able to work efficiently with ground force staffs in an advisory capacity, as well as to act as forward controllers. The provisions of paragraph 27, Training Circular Number 17 and of paragraph 19, Training Circular Number 30 would provide officers comparable in background and ability to those trained and utilized in the European Theater. The primary difference is that under Circular Number 17, it is required that all liaison officers be rated pilots, while in the European Theater, though that principle was followed, it could not always be adhered to. In the early part of the campaign, before combat experienced pilots could be trained in liaison duties, many air force officers who were not rated pilots acted as TALO's and in the main, functioned very efficiently.

19. Procedure. Under both systems, the procedure for the employment of medium and heavy aircraft is similar. Under this procedure, as the result of plans made at the army-tactical air command level and higher, the ground and air arms simply carried out, semi-independently, the previously agreed upon plans. The element of timing normally was not important, and the targets selected for the air usually were at such distance in front of the ground forces as to make close co-ordination unnecessary. When the time element was important, or when the air targets selected were close in front of the ground forces, as in such special air-ground operations as at St Lo, Eschweiler or Metz, procedure had to be altered to that used for the employment of fighter-bombers, which is discussed in de-

tail in the following paragraphs.

In the procedure for the employment of fighter-bombers, the two systems differ sharply. Under the standard system, employment of fighter-bombers is predicated upon the theory that the majority of the missions in the battle area will be "pre-planned" missions: i.e., attacks on stationary targets about which sufficient information is available to plan the attack on the day prior to its execution. The system recognizes that some missions will be "immediate request missions" i.e., missions that arise during the course of the days' battle, and which are desired immediately. For pre-planned missions, teletype orders are dispatched to the fighter groups early each night, and the missions are executed the following day. For request missions, the following procedure is prescribed. The requesting unit forwards necessary target information in a prescribed form (See paragraph 29, 2, War Department Training Circular Number 17) by means of the AGL net back to the information center at army headquarters, where the information is evaluated and a request may be prepared for army approval. If the request is approved, and accepted by the tactical air command, then the necessary instructions are sent to a fighter group to enable them to fly the mission and the requesting unit is informed by means of the AGL net that the mission will be flown.

This standard system is the same as that followed in the European Campaign in Normandy; however, it was usually found to be too slow for priority three missions. From experience developed in Normandy, employment of fighter bombers in close cooperation missions became predicated upon the knowledge that the majority of these missions would be of the "request" or "immediate request" type.

To provide for this, tactical air commanders of the Ninth Air Force and of the XII Tactical Air Command arranged for a certain portion of their air strength to be provided for close cooperation missions with ground forces, when the situation warranted. The tactical air command daily plan of operation would include (1) fighter sweeps or bomber escort, or both, armed reconnaissance in the army-tactical air command zone of responsibility, and pre-planned attacks on specific targets; (2) provision for a specified number of squadrons or groups to perform close-in armed reconnaissance missions on the front of corps and divisions; and (3) visual and photographic reconnaissance missions.

The air units designated for close-in armed reconnaissance, or close cooperation missions were assigned relatively close-in areas in a corps zone. Flights of varying strength were dispatched at regular time intervals, or as weather permitted to the corps zone. As the air units approached the battle area they would check in with the TALO of the corps or division for specific targets. After attack of any targets, or if there were no targets, the TALO would release the flight, and it

would proceed to its pre-briefed armed reconnaissance area. These air units remained at all times under the overall control of the tactical air command control center; however, they were controlled directly by the TALO while actually engaged in close cooperation missions in the immediate battlefield area.

For special or critical situations the tactical air commands employed their air effort usually in the same manner as that indicated in paragraph 30 of Training Circular Number 17.

The functioning of this system placed a high premium on advance planning, and close liaison between all echelons. It was necessary that air-ground personnel at corps and division make a daily estimate of their air requirements for the following day. This estimate was then transmitted by the most expeditious means; either by air-ground radio or teleprinter channels, or command telephone, to the combined operations center at army-tactical air command in sufficient time for it to be screened and perhaps considered in the nightly planning conference there. Under this system it was possible for the tactical air command to direct the employment of its air power in third priority missions expeditiously where most needed. And because of the close and continuous co-ordination, this employment permitted a high degree of safety and effectiveness for the ground units.

SECTION 6

CONCLUSIONS

20. General. Based on the preceding discussions and comparisons it is concluded that the system of G-2 and G-3 Air sub-sections as employed in the European Theater is superior to the separate air-ground liaison section prescribed in the standard system. The specific conclusions that follow herein form the foundation upon which this general conclusion is based.

21. With respect to organization, it is concluded that: a. The organization of G-2 and G-3 Air sub-sections provided the commanders and general staff of ground force headquarters from the army group down to the division with an effective means for joint air-ground cooperation. When these sub-sections were with the combat operations echelons of the tactical air force or tactical air commands, they also made available to the air commanders immediate advice on ground matters.

b. The standard air-ground liaison system does not provide the same effective means for joint air-ground cooperation. An organization to provide more than an information gathering service is necessary.

c. The standard air-ground liaison system probably provides for enough personnel to operate air-ground information centers at army and army group headquarters. It does not, however provide enough personnel to carry out the ground force phases of joint planning, supervision, and op-

erations in air-ground matters that are considered necessary. It is the opinion of this board that a minimum of four officers and six enlisted men are necessary for an army G-2 Air sub-section, and six officers and six enlisted men for an army G-3 Air sub-section. Conclusions for the organizational requirements of G-2 and G-3 Air sub-sections at army group are more difficult to arrive at, since this headquarters is not a standard organization. However, it is considered that the experience of 6th and 12th Army Groups in operation indicates a minimum of six officers and six enlisted men in the G-3 Air sub-section. For the G-2 Air sub-section, the AC of S, G-2, of 12th Army Group in "A Study of Operations of G-2 Air in the 12th Army Group" recommends thirteen officers and twelve enlisted men. This recommendation appears excessive to this Board, but it has no better source of information. It is concluded therefore that this G-2 recommendation should be adopted as a point of departure for further study.

d. Based upon the conclusion that G-2 and G-3 Air sub-sections are preferable to an AGLS in all echelons of command, the personnel provided for air-ground functions at corps headquarters are not sufficient. It is believed that one officer and one enlisted assistant to form the corps G-2 Air sub-section, and two officers and two enlisted assistants to form the corps G-3 Air sub-section are required.

e. At the division, the one officer and enlisted assistant provided for air-ground liaison in Training Circular Number 17, are sufficient.

f. The placing of GLO teams in a theater headquarters pool is sound. It is considered so sound that the opinion of this Board is that all GLO's and enlisted assistants should be carried in the theater organization. This would permit centralized procurement, administrative control, and assignment to air units according to the air order of battle (a factor not possible in the improvised GLO sections of armies and army groups in the European Theater). GLO teams should be assigned to air units of the strategic and tactical air forces as required. Theater headquarters should retain administrative control over all of the GLO's, and operational control of the GLO teams with the strategic air forces (and with the tactical air force if there is no army group headquarters). GLO teams assigned to air units of the tactical air force not in the tactical air command should be placed under operational control of G-3 Air (or G-2 Air for reconnaissance GLO's) of the army group. GLO teams assigned to air units of the tactical air command should be placed under operational control of G-3 Air of associated army (or G-2 Air for reconnaissance GLO's).

22. With respect to duties, responsibilities and functions it is concluded that: a. The daily conferences between the army group and tactical air force commanders, and the several army and tactical air commanders, and "their combined operations centers" formed the keynote of the success of air-ground cooperation between 12th Army Group and Ninth Air Force. The "combined operations center" principle adopted by these headquarters allowed the

decisions of the commanders to be carried out most effectively. Since this air-ground team comprised the bulk of the combat ground and tactical air forces in the European Theater, its high degree of success indicates strongly the adoption of its "combined operations center" principle over any other method of air-ground cooperation.

b. Efficient air-ground cooperation requires ground liaison personnel to be charged with more than the operation of an information center. This personnel should be charged also with the ground phase planning and operational responsibility to insure the continuous functioning of the "combined operations" principle at all command echelons. This is accomplished best by the physical association of ground and air operations personnel.

23. With respect to equipment, it is concluded that:

a. The equipment finally procured by various means for use in the European Theater, which is essentially the same as listed in War Department Training Circular Number 17, is adequate for the proper functioning of an air-ground liaison section.

b. Provision of appropriate T/E's to standardize the procurement of this equipment should be made.

24. With respect to Command and Control, it is concluded that the principles outlined in FM 100-20, and as re-iterated in War Department Training Circulars Number 17 and 30 were proved sound in their successful application in the European Theater.

25. With respect to Communications, it is concluded that: a. The signal company, air-ground liaison, army, as provided by Training Circular Number 17 for army and army group headquarters would be inadequate even for the functioning of an air-ground information center. In order to carry out the functioning of a comprehensive air-ground liaison system, adequate communications for the signal company demands provision for both G-2 and G-3 Air traffic, and must include:

(1) Mobile radio nets from (a) Army group to theater, adjacent army groups, strategic air forces, armies, and GLO's with air units of the tactical air force; (b) Army to all corps, divisions, and GLO's with the fighter and reconnaissance groups of the tactical air command.

(2) Provision for fully adequate code and cipher personnel at all stations.

(3) The adoption of a special air-ground code similar to that used by British Army Phantom Teams (Non-repeat substitution cipher).

(4) The establishment of exclusive teleprinter wire communications, or radio teleprinter as it is

developed, for air-ground purposes from army groups to armies and from armies to corps.

b. While it is not within the province of this study to comment on air force communications, it is considered that neither Training Circular Number 17 nor Number 30 enunciate clearly how the air-ground liaison communication facilities, and the air force control communication facilities are to be co-ordinated. The facilities of the two systems should be integrated at the corps and divisions. This subject should be made the study of a War Department joint air-ground agency.

26. With respect to training and qualifications of air-ground personnel it is concluded that: a. The provisions of Section VI, Training Circular Number 17, for the training and qualifications of both ground and air force liaison officers are adequate.

b. Ground liaison officer schools should include balanced instruction in both air and ground force organization, tactics, capabilities and limitations, as well as specialized air-ground procedure.

27. With respect to procedure, it is concluded that:

a. The daily joint planning conference outlined in Training Circulars Number 17 and 30 is sound and should be practiced.

b. Tactical air operations are most successful when planned in advance.

c. The procedure for requesting light, medium or heavy bombardment effort in tactical operations is adequate. Requests for air effort of this type should be made on a pre-planned basis.

d. The procedure for processing of requests for fighter-bomber third priority missions, both pre-planned and "request", as laid down in Training Circular Number 17 is too slow. (See paragraph 19, Section 5.)

e. The method devised by tactical air commanders in the European Theater for third priority close-in air cooperation satisfactorily served the ground force needs. (See paragraph 19, Section 5.)

28. With respect to future air-ground liaison publications it is concluded that a War Department agency composed of air and ground force personnel should be designated to study and revise Training Circulars Number 17 and 30. The findings and recommendations then should be given field manual status.

SECTION 7

RECOMMENDATIONS

29. Based upon the preceding comments and conclusions,

the recommendations of this Board are as stated in paragraphs that follow.

30. With respect to organization for air-ground liaison it is recommended that: a. The G-2 and G-3 Air Branch plan of organization be adopted in lieu of a separate air-ground liaison section prescribed in War Department Training Circular Number 17.

b. Personnel for these general staff sub-sections be provided for in the various headquarters in the grades and ratings approximately as shown in chart following:

<u>ARMY GROUP</u>		<u>ARMY</u>		<u>CORPS</u>		<u>DIVISION</u>	
<u>G-2 Air*</u>		<u>G-2 Air</u>		<u>G-2 Air</u>		<u>G-2 Air</u>	
Colonel	(1)	Lt Colonel	(1)	Lt Colonel	(1)	None.	
Lt Colonel	(4)	Major	(2)	Tec 4	(1)		
Major	(3)	Captain	(1)				
Captain	(2)	T/Sgt	(1)				
1st Lt	(3)	Tec 3	(1)				
M/Sgt	(1)	Tec 4	(2)				
T/Sgt	(1)	Tec 5	(2)				
S/Sgt	(1)						
Tec 3	(3)						
Tec 4	(1)						
Tec 5	(3)						
Pfc	(2)						
<u>G-3 Air</u>		<u>G-3 Air</u>		<u>G-3 Air</u>		<u>G-3 Air</u>	
Colonel	(1)	Colonel	(1)	Lt Colonel	(1)	Major	(1)
Lt Colonel	(1)	Lt Colonel	(1)	Captain	(1)	Tec 4	(1)
Major	(4)	Major	(2)	S/Sgt	(1)		
T/Sgt	(1)	Captain	(2)	Tec 4	(1)		
S/Sgt	(3)	T/Sgt	(1)				
Tec 5	(2)	S/Sgt or					
		Tec 3	(1)				
		Tec 4	(3)				
		Pfc	(1)				

GLO Section - See sub-paragraph c. following.

*Personnel based upon recommendations contained in "A Study of Operations of G-2 Air in the 12th Army Group". This Board recommends the G-2 Air organization only as a point of departure for further study. (See Paragraph 21, c, supra.)

c. A GLO section to contain all ground liaison officer and enlisted personnel assigned to the theater be organized at theater headquarters. Administrative control and operational assignment will be as stated in paragraph 21, f, of this study. Composition of GLO teams normally will be the double team type prescribed in paragraph 13, b, Training Circular Number 17.

31. With respect to duties, responsibilities, and functions it is recommended that: a. The "combined operations center" principle be adopted with G-2 and G-3 Air personnel adjacent to or in the same shelter with the air operation and intelligence staff personnel.

b. The G-2 and G-3 Air, under the staff direction of G-2 and G-3 respectively, be charged with all duties and responsibilities necessary for the functioning of this principle.

32. With respect to equipment it is recommended that the G-2 and G-3 Air sub-sections, and the GLO section, be provided suitable equipment in the T/O and E.

33. With respect to command and control it is recommended that the principles contained in Field Manual 100-20 be retained.

34. With respect to communications it is recommended that: a. Separate channels of communication for air-ground liaison be mandatory.

b. Appropriate War Department agencies designate air and ground officers to make a special study of this subject, and adequate tables of organization and equipment be drawn up for signal units, air-ground liaison, army.

c. Study also be made to provide for the necessary integration of the air-ground communication system with the air force tactical control system.

35. With respect to training and qualification it is recommended that officer personnel for air-ground liaison work possess the following qualifications: a. Personality to maintain harmonious relations with air and ground personnel.

b. Reasonable proficiency in the tactics, technique, capabilities, limitations, and procedure of the ground arms, and tactical air force units.

c. Experience in both troop and staff duty.

d. Graduate of service or general staff schools, or equivalent experience.

e. Special training in an air-ground liaison school where emphasis is placed on the provisions of a. and b. above.

36. With respect to procedure it is recommended that air-ground methods and facilities for screening and forwarding requests for third priority air cooperation missions be the subject of continuing study by the appropriate War Department agency.

37. With respect to future air-ground liaison publications it is recommended that appropriate War Department agencies designate air and ground force personnel to study and revise all existing publications dealing with air-ground matters.

1. War Department Training Circular Number 17, Air-Ground Liaison, 20 April 1945.
2. Field Manual 100-20, Command and Employment of Air Power.
3. Effect of Air Power on Military Operations, Western Europe, Air Effects Committee, 12th Army Group.
4. A Study of Operations of G-2 Air in the 12th Army Group.
5. Study on Air-Ground Cooperation, Headquarters VII Corps 6 June 1945.
6. Final Report, G-3 Section, 6th Army Group.
7. Operational Memorandum Number 14, Headquarters Seventh US Army, 1 November 1944.
8. War Department Training Circular Number 30, Tactical Air Command: Organization and Employment, 19 June 1945.
9. G-3 Section, 12th Army Group, Report of operations (Final After Action Report).

- Appendix Number 1 - True copy of The General Board's Directive to prepare a Report on "Organization, Operations, and Equipment of Air-Ground Liaison in all Echelons from Divisions Upwards", dated 3 October 1945.
- Appendix Number 2 - Chart showing 12th Army Group G-2 and G-3 Air Radio Communication Nets.
- Appendix Number 3 - Chart showing First Army-IX Tactical Air Command Air Cooperation Communication System.
- Appendix Number 4 - Chart showing Seventh Army Air Support Control Section Communication System.

C O P Y

THE GENERAL BOARD
UNITED STATES FORCES, EUROPEAN THEATER
APO 408

R 322.01/2 TGBSY

3 October 1945

STUDY DIRECTIVE NUMBER 144. (Later changed to Number 21)

TO : Assistant Chief of Staff, G-3.

SUBJECT : Organization, Operations, and Equipment of Air-Ground Liaison in all Echelons from Divisions Upwards.

1. Mission.

Prepare report and recommendations on air-ground liaison organization, operation, and equipment.

2. Scope.

Report and recommendations will include consideration of the following:

- (1) An analysis of the air-ground liaison systems used by 6th Army Group and 12th Army Group.
- (2) An analysis of the system provided by War Department Training Circular 17, 1945, and comparison of this system with other systems used in this theater.
- (3) Recommendations as to the best system or combination of systems to accomplish efficient air-ground liaison, to include source and qualifications of personnel and general characteristics of equipment.

3. Source Material.

a. Personnel now with War Department and other agencies who were connected with the development of the air-ground liaison system used in this theater.

b. War Department Training Circular Number 17, 1945.

4. Instructions.

a. See Plan of Operation, The General Board.

b. You are authorized to request the assistance of other sections in the preparation of this report. Requests for the assistance of other staff sections will be initiated without delay and will include the general nature and scope of the assistance desired together with the

approximate date upon which this information will be required.

c. You are further authorized to request the assistance of agencies and personnel under jurisdiction of United States Forces, European Theater in preparation of the report. Such requests will be submitted to the Secretariat.

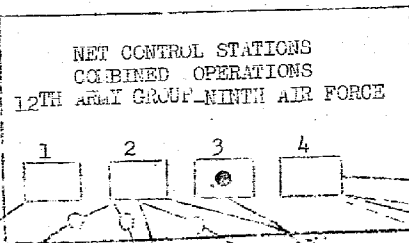
FOR THE PRESIDENT OF THE BOARD:

/s/ L. R. Garrison,
/t/ L. R. GARRISON,
Colonel, AGD,
Secretary.

G-2/G-3 AIR

R A D I O C O M M U N I C A T I O N N E T S

12TH ARMY GROUP-NINTH AIR FORCE
HEADQUARTERS



IX TAC * FIRST ARMY

XIX TAC * THIRD ARMY

XXIX TAC * NINTH ARMY

FIFTEENTH ARMY

9TH BOMB DIV

9TH TACTICAL RECCE GP

EIGHTH AIR FORCE

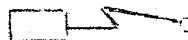
67th Tactical Reconnaissance Group

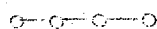
10th Tactical Reconnaissance Group

363rd Reconnaissance Group

Fifteenth Army switches into the TAC net which furnishes them with air cooperation.

* Net No. 4 will use the crypto team and unit message center of the assigned unit.

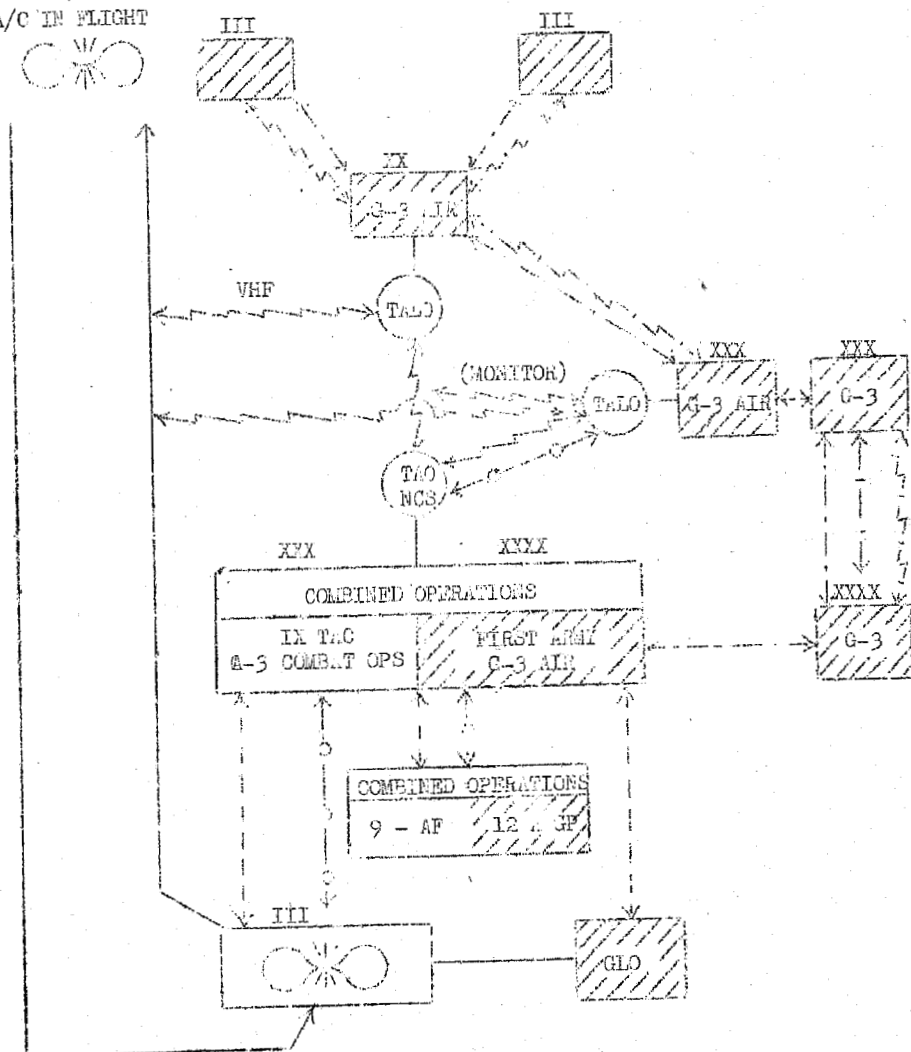
 Various Nets

 Night frequency (Emergency stand-by from 2400 to 0700 hours)

 Crypto teams

IX TAC-FIRST U.S. ARMY AIR COOPERATION COMMUNICATIONS SYSTEM

A/C IN FLIGHT



AIR UNIT



GROUND UNIT



COMMUNICATIONS
(TAC)



GROUND COMMUNICATIONS
(ARMY)

← TELEPHONE →

← TELEPHONE →

← TELEPRINTER →

← TELEPRINTER →

← RADIO →

← RADIO →

